CLAIMS

1. A soft magnetic material comprising

a plurality of composite magnetic particles (40),

each of said plurality of composite magnetic particles (40) having: a metal magnetic particle (10) including iron; a lower film (20) surrounding a surface of said metal magnetic particle (10) and including a nonferrous metal; and an insulating upper film (30) surrounding a surface of said lower film (20) and including at least one of oxygen and carbon,

wherein said nonferrous metal has an affinity with the at least one of oxygen and carbon included in said upper film (30) that is larger than such affinity of iron.

2. The soft magnetic material according to claim 1, wherein said nonferrous metal includes at least one selected from the group consisting of aluminum, chromium, silicon, titanium, vanadium and nickel.

3. The soft magnetic material according to claim 1, wherein said lower film (20) has an average thickness of not less than 50 nm and not more than 1 μm.

4. The soft magnetic material according to claim 1, wherein said upper film (30) includes at least one selected from the group consisting of a phosphorus compound, a silicon compound, an aluminum compound, a zirconium compound and a titanium compound.

5. The soft magnetic material according to claim 1, wherein said upper film (30) has an average thickness of not less than 10 nm and not more than 1 μm.

6. A dust core fabricated using the soft magnetic material according to claim 1.

7. The dust core according to claim 6, further comprising an organic matter (50) disposed between said plurality of composite magnetic particles (40) to join said plurality of composite magnetic particles (40) together and including at least one selected from the group consisting of a polyethylene resin, a silicone resin, a polyamide resin, a polyimide resin, a polyamide imide resin, an epoxy resin, a phenolic resin, an acrylic resin and a polytetrafluoroethylene.

8. A method of manufacturing the dust core according to claim 6, comprising the steps of:

by pressure-forming said plurality of composite magnetic particles (40), forming a molding; and

heat-treating said molding at a temperature of not less than 500°C.

9. A soft magnetic material comprising

a plurality of composite magnetic particles (40),

each of said plurality of composite magnetic particles (40) having: a metal magnetic particle (10) including iron; a lower film (20) surrounding a surface of said metal magnetic particle (10) and including a nonferrous metal; and an insulating upper film (30) surrounding a surface of said lower film (20) and including at least one of oxygen and carbon,

wherein said nonferrous metal has a diffusion coefficient with respect to the at least one of oxygen and carbon included in said upper film (30) that is smaller than such diffusion coefficient of iron.

10. The soft magnetic material according to claim 9, wherein said nonferrous metal includes at least one selected from the group consisting of aluminum, chromium, silicon, titanium, vanadium and nickel.

11. The soft magnetic material according to claim 9, wherein said lower film (20) has an average thickness of not less than 50 nm and not more than 1 μm.

12. The soft magnetic material according to claim 9, wherein said upper film (30) includes at least one selected from the group consisting of a phosphorus compound, a silicon compound, an aluminum compound, a zirconium compound and a titanium compound.

13. The soft magnetic material according to claim 9, wherein said upper film (30) has an average thickness of not less than 10 nm and not more than 1 μm.

14. A dust core fabricated using the soft magnetic material according to claim 9.

15. The dust core according to claim 14, further comprising an organic matter (50) disposed between said plurality of composite magnetic particles (40) to join said plurality of composite magnetic particles (40) together and including at least one selected from the group consisting of a polyethylene resin, a silicone resin, a polyamide resin, a polyimide resin, a polyamide imide resin, an epoxy resin, a phenolic resin, an acrylic resin and a polytetrafluoroethylene.

16. A method of manufacturing the dust core according to claim 14, comprising the steps of:

by pressure-forming said plurality of composite magnetic particles (40), forming a molding; and

heat-treating said molding at a temperature of not less than 500°C.